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H. De Waard, and Peter D. Adams

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gered by the motion of the head from sensors in the inner ear . . ." resulting from the ". . . sudden and rapid motion of the fielder's head as he looks upward to follow the flight of the ball off the bat may provide the sensory information that directs the player's body toward the eventual landing point." Hence, "we may be judging fly balls by ear."

I suggest that the ear is indeed an important element in the judgment of a fly ball, but for a much more simple reason than that offered by Brancazio (ironically omitted from the acoustics section). Outfielders learn to judge the trajectory of a fly ball by both visual and acoustical information. The sound made on impact is easily recognizable by all experienced players, and readily translated into an estimate of force. Brancazio notes the ability of one-eyed outfielders to learn to judge fly balls. It would be interesting to determine how readily deaf outfielders are able to compensate.

CLAIR J. CHEER
1/84 University of Rhode Island, Kingston

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As a physicist who is spending substantial time in other areas, I wish to express my appreciation for the lucid coverage of recent developments given in the special insert "Physics News in 1983" in January.

As you know, reading original research reports can be fascinating but often requires a certain amount of research by the physicist outside of the special field involved to ascertain the motivation and sequence of decisions which have led to the particular project described.

The broader view provided by the articles in the AIP special insert avoids this problem of orientation and has been very gratifying to me.

DAVID L. HILL
1/84 Southport, Connecticut

Secondary science teaching

Would you or one of your readers identify just one college or university that requires more than one one-term, three-credit course in methods for prospective secondary-school science teachers? In 40 years of examining college catalogs I have failed to find such a school.

Frankly, I believe developing and testing learning theories is a legitimate area of study. It seems the more one distances himself from the secondary-school classroom and the less that individual knows about psychology, the more expert that person becomes in classroom management.

I believe science teachers face devastating problems on both the secondary and university levels. The reign of the occult and drugs and the decline of traditional Western religious values with a belief in truth as a reality are removing the younger generation from the world as the older generation views it. The tremendous effort at remediation in even the "best" institutions may well be futile.

MARTIN D. STEWART
2/84 Norwalk, Connecticut

Consultant-fee problem

I have just received an invitation to apply for a summer position at an NSF-sponsored workshop at the California Institute of Technology that will assist in adopting the television series "The Mechanical Universe" for use in high schools.

At first I was honored, enthusiastic and happy that this summer my employment could be related to physics. Finally, someone has heeded the call to employ high-school science teachers year-round to stem the tide of teachers leaving for industry!

But alas, my enthusiasm quickly faded when I learned that the honorarium for the expert consultants is $125 per week. I am left wondering, and the readers of PHYSICS TODAY might answer me, how much would an industrial consultant charge?

ERNEST W. KUEHL JR
Lawrence High School
4/84 Cedarhurst, New York

Fusion criterion

Contrary to the claim, "MIT tokamak Alcator C exceeds Lawson criterion" (February, page 20), the MIT device achievement is a factor of 200 away from the *proper* Lawson criterion, provided one neglects the bremsstrahlung radiation losses. The proper Lawson criterion is strongly temperature-dependent and is given by (see J. R. McNally, *Nuclear Technology/Fusion* **2**, 9, 1982):

$$n\tau_E = \frac{24T}{\langle \sigma v \rangle_{DT} Q} \cdot \frac{1}{1 - 2P_B/P_N}$$

where, for Alcator C, $T = 12.5$ keV, $Q = 17\,600$ keV (neglecting neutron capture energy release in a blanket), and $\langle \sigma v \rangle = 7 \times 10^{-20}$ cm^3/sec. P_N is the total nuclear power release and P_B is the bremsstrahlung power loss, which exceeds P_N for $T < 4$ keV!

The proper Lawson correlation of T versus $n\tau$ can be readily seen from the graph in the news story by drawing a horizontal line through the experimental point to the intersection with the appropriate $n\tau$ curves. Thus, PLT and PDX are about a factor of 100 away from the thermalized breakeven curve.

A more realistic parameter for the thermalized breakeven criterion is discussed in another paper of mine (Nucl. Sci. and Eng. **67**, 255, 1978). The effect of non-thermalized plasmas (that is, beam-driven) can be analyzed in terms of the four-factor fusion formula, $k = f n \epsilon p$; however, even here the presence of impurities worsens the approach to breakeven.

J. RAND MCNALLY JR
2/84 Oak Ridge, Tennessee

Following the MIT usage, we used the expression "Lawson criterion" in a narrow and perhaps misleading way—the lowest $n\tau$, at any temperature, that could yield breakeven in a thermalized D–T plasma. We agree that it is better to quote it as a function of temperature. In that sense, as we pointed out, Alcator C is still far from the Lawson criterion. —BMS

Size of manuscript paper

Whenever I send a manuscript to one of the journals published under the auspices of AIP, its receipt is acknowledged with the note: "In future please use paper no larger than 22×28 cm." Although these dimensions conform with the American standard size of $8\frac{1}{2} \times 11$ inches, they are at variance with the standardized 21×29.7 cm^2 (A4) size that now is used throughout Europe (including Great Britain). I do not know if you receive any manuscripts from Europe where conscientious authors have cut off 1.7 cm to satisfy your wishes. If so, could you not remove the considerable burden of guilt of all those who fail to do so by relaxing the present requirement?

H. DE WAARD
University of Groningen
1/84 The Netherlands

COMMENT FROM APS: There is obviously a need to establish some standard for the size of paper used for submitted manuscripts. The American standard is used in this country for the very practical reason that office equipment, copiers, filing cabinets, folders and so on are geared to that standard. Paper sizes that do not conform require special handling, especially for copying or filing. However, provided authors restrict the dimensions of the typed area on each page, the use of European-standard paper does not cause too much of a problem.

Of rather more importance is the practice of submitting oversized figures. These are subject to serious damage either in the mails or in intra-office handling. Authors are strongly encouraged to submit original drawings or good quality glossy prints that do not exceed the normal paper sizes.

PETER D. ADAMS
Deputy Editor-in-chief
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